

THE EFFECTS OF UNAVAILABILITY OF TECHNICAL STORAGE FACILITIES TO THE MARKETING OF FRUITS AND VEGETABLES FOR ECONOMIC DEVELOPMENT IN MOROGORO RURAL AND URBAN DISTRICTS

B.J. Kasimila¹, R.M. Wambura² and S.A.M. Nnko³

ABSTRACT

Fruits and Vegetables are basically horticultural products, which deteriorate fast after harvest. High moisture contents and tenderness characterize them. These fruits and vegetables had a very low profile in Morogoro region in the past, but since 1980s they are increasingly being strategic products because they provide employment and contribute to family income. This paper is based on the authors' study (1998) on "the effects of the unavailability of the technical storage facilities to the marketing of fruits and vegetables for economic development in the two districts". The study focused on the major causes of fruits and vegetables its losses and on determination of the trend and constraints pertaining to the fruits and vegetables production and marketing. Primary data were obtained through interviews with randomly selected fruits and vegetables farmers, wholesalers, retailers and consumers. Other data were obtained through group discussions with key informants and personal observations and notes in diary form. The data analysis employed the use of descriptive The main losses identified were both qualitative and quantitative resulting from damages occurring mainly during transportation and unavailability of technical storage facilities at the markets. The paper concludes that Morogoro rural and urban districts seriously lack transport and storage facilities for horticultural products. Intervention strategies that have to be taken to improve the marketing and storage of vegetables and fruits in Morogoro rural and urban district are presented.

1. INTRODUCTION

Fruits and vegetables are becoming increasingly strategic products in. Their constant supply even during off-seasons calls for intervention strategies that will ensure reduction of the qualitative and quantitative losses. The importance of fruits and vegetables consumption is not basically of their flavour and good appearance to our daily food, rather they are the major

¹ *Development Studies Institute, Sokoine University of Agriculture, P.O. Box 3024, Morogoro.*

² *Institute of Continuing Education, Sokoine University of Agriculture, P.O. Box 3044, Morogoro*

³ *Food Science and Technology, Sokoine University of Agriculture, P.O. Box 3006, Morogoro.*

sources of calories, minerals, proteins, vitamins and fibres. These elements are very essential in maintaining and improving a healthy condition of any human being, especially those living under subsistence levels with vitamin A deficiencies. Fruits and Vegetables had a very low profile in the past, possibly because majority of people had no better appreciation of the nutritive values. However, since 1980s these produce have become increasingly strategic products, not only because of the improved awareness of their nutritive values by majority of Tanzanians but also that they provide employment and contribute to family income. In some urban and rural areas, fruits and vegetables are important profitable small-scale juice enterprises (Thomson, 1990). As prices of meat, fish and beans remain prohibitive to majority of the consumers, therefore, fruits and vegetables serve as substitute and provide almost the same nutrients as those in fish, beans and meat though in different proportions and at different intake intensity.

Fruits and vegetables are basically horticultural products which deteriorate fast after harvest and they are characterised by high moisture contents and tenderness. Their constant supply even during off-season demands the availability of technical storage facilities and a careful handling especially during harvesting and transporting them. El-Kamenash (1969) argues that technology brings changes i.e. economic development to a society, such as the rise of industrial food processing and storage methods. Smith & Hansen (1969) maintain that technological progress means the introduction of new techniques, which rise the productivity of available resources. In this case, "technical storage facilities" refer to employment of new techniques in handling of agricultural products in order to avoid quality and quantity losses. Technical storage facilities include cold rooms, refrigerators, freezers, etc.

Storage life of fruits and vegetables is extended under refrigerated storage conditions and this provides more optimum time of marketing the products. Vegetables i.e. cabbages can have a storage life of 1-2 months (Lolenz & Maynard, 1980). Technical storage facilities offset the seasonality supply and price fluctuations of the fruits/vegetables (Janick, 1972). The advantages of technical storage facilities include extending marketing season, gives longer shelf – life of fruits and vegetables, better prices, retention of quality and long storage with disease i.e. soft rot and spot do not develop (Ryall, 1978). Technical storage facilities are the basis for control of hygienic, sanitary and preventive loss conditions. This also contributes to protection of the environment since garbages of rotten fruits and vegetables of fruits do not accumulate (Hussain, 1996).

According to Mlambiti (1975) fruits and vegetables at their peaks of qualities are highly perishable and should be harvested, handled and processed within a few hours. Janick (1972) reports that transportation, rough handling and holding of fruits/vegetables at undesirable temperatures increase their losses. Thomson (1993) and Mlambiti (1975) maintain that losses of nutritional quality is a result of physiological and biochemical processes which necessitates employment of new storage techniques at all levels of market operations. According to Ryall (1978) reports that marketing losses e.g. in peaches could be due to over-ripens and decay. FAO (1975) estimated that while post harvest losses of cereals are generally 5-10%, those of fruits/vegetables are 30-40%, and that losses of nutritional quality is a result of physiological and biochemical process.

Frucker (1958) argues that an agricultural market is a place (or area) for organising and facilitating business activities. Efficient marketing is the most important multiplier of economic development. Janick (1972) looks at agricultural marketing as a means for increasing the values of horticultural products through the application of marketing functions i.e. exchange physical and facilitating.

The major objective of this study was to identify the effects of the unavailability of technical storage facilities to the marketing of fruits and vegetables for economic development in Morogoro rural and urban districts. The following sections provide the methodology, findings, recommendations and conclusion of this study.

2. METHODOLOGY

Randomly sampling technique was used from interviews from 50 farmers in five villages, namely Mgeta, Tchenzema, Mlali, Turiani and Matombo, 16 wholesalers, 8 retailers and 14 consumers. The method of analysis for descriptive quantitative and qualitative employed percentages. In summarising the data, great care was taken to ensure that it accurately reflected the meanings of responses made.

3. FINDINGS AND DISCUSSION

This study found that vegetables produced in Morogoro rural and urban districts include fresh beans, tomatoes, plums peaches, pears and cauliflower. Leafy vegetables are tangerines, cabbages, spinach, eggplants, peas and

amarathus. Fruits include oranges, mangoes, banana, pineapples and passion fruits. This section is divided into four parts, namely

- The major causes of quantitative and qualitative losses of fruits and vegetables realised by farmers, wholesalers, retailers and consumers.
- The trend and constraints pertaining to fruits and vegetables marketing.

This second part is divided into three sub-sections, namely

- Major marketing procedures/chains by farmers.
 - Estimated total sales of fruits and vegetables by farmers in three rainy and dry seasons (1994/95 – 1996/97) in percentages.
 - Estimated total sales of fruits and vegetables by wholesalers in three rainy and dry seasons 1994/95 – 1996/97 in percentages.
- Recommendations
 - Conclusions

Fruits and vegetables production and supply are seasonal with fluctuating prices due to environmental limitations as well as supply and demand. The production is mainly done by small-scale farmers who use hand hoes, depend mainly on unpaid family labour. The use of out-dated tools of production compels farmers to intercrop horticultural and non-horticultural crops in order to maximise the cultivated land, to avoid risks of losing if farmers were to rely on single stand crop production pattern in case of natural disaster such as drought, flood, pest infestation, disease outbreak would occur.

Production areas of fruits and vegetables are mainly in Morogoro rural district, namely Mgeta, Matombo, Tchenzema, Turiani, Mkuyuni and Mlali villages. The major producing areas of tropical fruits in Morogoro rural district is Matombo, Mkuyuni, Kisiaki, Turiani, Msagati and Tawela. The temperate fruits and vegetables mainly come from hilly areas of Tchenzema and Mgeta. Mlali is prominent for tomatoes.

Intercropping in the horticultural production areas mentioned is commonly used.

For example, in Mgeta, cabbages and green peas are intercropped with maize and soya beans. Among all six production areas mentioned above, Mgeta is the major horticultural production area. This is mainly due to good rainfall of about 1500 mm per annum and a more favourable environmental condition than the others areas. More than 90% of the farmers in this area are engaged in horticultural production and about 7,000 tons are estimated to be produced annually.

The high prices of fish, pulses and meat which majority of the Tanzanians cannot afford, have led to increased consumption of fruits and vegetables. Fruits and vegetables production provide employment and major sources of family income.

The major markets for the horticultural products in the above mentioned areas are Dar es Salaam city and Morogoro town. Reliable transport and technical storage facilities are vital not only for maintaining the quality of these horticultural products for marketing purposes but also in minimising their losses.

3.1 The major causes of fruits and vegetable losses

Study respondents were asked to identify major causes of fruits and vegetable losses are indicated in Table 1.

Table 1: Respondents opinions (N = 50) on the major causes of fruits and vegetable losses

Respondents	Lack of storage		Transportation		Bad packing	
	No	%	No	%	No	%
Farmers	50	86.5	4	6.7	4	6.7
Wholesalers	10	62.5	2	12.5	4	25
Retailers	4	50	1	12.5	3	37.5
Comsumers	10	71.4	2	14.3	2	14.3

From Table 1, it is clear that the major causes of fruits and vegetables losses is the unavailability of technical storage facilities in the production areas and at the markets in urban areas. The other causes are bad packing methods and transportation system.

From the observation, cabbages are packed in sacks, each with an average of 80 to 120kg. Leafy vegetables are also packed in sacks, each with an average of

20 kg., oranges, tomatoes and eggplants in “Tengas”, with approximately 60 kg. The major concern of the farmers is to pack as much as possible in order to get rid of them due to lack of technical storage facilities. It was also observed that this is the result of low level of traditional skills of preserving the vegetables e.g. sun drying.

Buses, lorries and pickups used for transporting the harvest are not designed for this purpose. Lack of appropriate transport facilities contribute also to the losses. These transport facilities used for transportation of fruits and vegetables are not designed for that purpose. There are special ones with cooling system designed for transporting horticultural produce.

Surprisingly none of the respondents indicated oversupply, low quality or high prices of the produce as a major factor contributing to the losses. Through group discussions, it was observed that the respondents were more concerned with the total amount of rotted or discarded fruits and vegetables due to causes discussed in this paper than on oversupply, low quality or high prices of the produce as a major factors contributing to losses. The total amount of rotted or discarded is bigger than the marketed one.

3.2 The trend and constraints pertaining to fruits and vegetables marketing major marketing procedures/ chains of farmers

Farmer respondents' opinions were sought on major marketing procedures/chains used by them in the study areas. The findings are indicated in Table 2.

From Table 2 it has been learnt that the major marketing procedure for horticultural produce is that the farmers harvest their produce, pack and carry them by head to the collection points alongside the major roads and wait for buyers/traders. It was observed that most of the buyers/traders are wholesalers.

- It was observed that most of the production areas and the collection points alongside the major roads are connected with footpaths. They are impassable by lorries in rainy and in dry seasons. The farmers resort to carrying their produce by heads which led to less volume being transported and marketed and a large portion rotting or being discarded. Construction of good roads connecting the production areas and the collection points is vital.

Table 2: Farmer respondents (N=50) opinions on major marketing procedures

Types of marketing procedure		Respondents	
		No.	%
No. 1	Small-scale farmers harvest the produce, pack and carry them by head to the collection points along the major roads and wait for buyers/traders.	47	94
No. 2	Small-scale farmers harvest and sell their produce to medium farmers who own personal/hired transport facilities who take the produce to the markets of Dar es Salaam and Morogoro Municipality.	3	6
No. 3	Small-scale farmers hire vehicles by sharing the costs and collect the produce from the collection points alongside the major roads and transport them to the markets for transaction.	0	0
No. 4	Traders go to the farms, negotiate the prices for the produce, they hire labour for harvesting, pack and hire transport to distribute the produce to the markets in different places.	0	0
No. 5	Traders go to the farms and ask the small-scale farmers to harvest, buy, pack and transport the produce to markets by using hired transport.	0	0

- It was also noted that this horticultural produce brought by different farmers to collection point were not all purchased by the wholesalers at once. Some remained there for a day or more before being purchased and some decay. It should be noted here that deterioration process of these produce begin immediately after detaching the produce from the plant. With proper technology this can however be checked. Since horticultural produce deteriorate very fast, it is very necessary to have central technical storage facilities e.g. cold rooms at collection points to preserve the produce of the farmers for sale and a portion of the harvest to be preserved through the application of traditional methods e.g. sun drying.

The head transportation system depends also on the weather. When it heavily rains the farmer cannot bring his produce from the farm to the collection points. The farmer can only do that when there is no rain and physically fit.

3.3 Estimated total sales of fruits and vegetables by farmers in three rainy and dry seasons

Farmer respondents were asked to estimate on average, their total sales from various fruits and vegetables produced in three rainy and dry seasons (1994/95 – 1996/97) in percentages.

Table 3: Farmer respondents' (N = 50) opinions on estimate average sales of their fruits and vegetables in percentages in three rainy and dry seasons (1994/95 – 1996/97) by villages

Villages	Farmer respondents			
	Rainy season		Dry season	
	No.	%	No.	%
Mgeta	10	39	10	40
Tchenzema	10	33	10	34
Mlali	10	46	10	45
Turiani	10	44	10	31
Matombo	10	51	10	50

3.4 Estimated total sales of fruits and vegetables by wholesalers and retailers in three rainy and dry seasons

Wholesaler and retailer respondents were asked to estimate, on average, their total sales of fruits and vegetables in three rainy and dry seasons (1994/95 – 1996/97) in percentages.

From Table 4 we learn that the wholesalers made more sales in both seasons than the retailers. The reasons are:

It was learnt that majority of the wholesalers interviewed in Morogoro Municipality make good sales of fruits and vegetables in dry seasons but with marginal profits due to stiff competition of the same produce from neighbouring regions.

- From Table 4, the retailers made losses in their business in rainy seasons. It was observed that the produce in sacks or in “Tengas” are packed in a manner which is very difficult for a retailer to even estimate the spoiled amount of the produce in the sacks or in “Tengas”. The retailers purchase the packed produce at their own risks.

Table 4: Wholesaler and retailer respondents' estimate of (N=24) total sales of fruits and vegetables in three rainy and dry seasons (1994/95 – 1996/97) in percentages

Seasons	Type of respondents			
	Wholesalers		Retailers	
	No.	%	No.	%
Rainy season	8	90	4	42%
Dry season	8	90	4	50

- It was also observed that the losses caused by poor transportation system is mainly realised by retailers. The produce from the production areas to collecting points are transported by heads and they might stay there for a day or more before being purchased by wholesalers who transport them to markets in town. The retailers purchase the packed produce without knowing how long the packed produce have stayed at the collecting points and with the wholesalers.

In rain seasons majority of urban dwellers produce their own vegetables in their small open places for their own consumption. They prefer to consuming their own grown vegetables to buying other kinds of vegetables from the market.

- A considerable number of urban dwellers produce vegetables in open urban areas for marketing particularly in rain seasons. Vegetable producers in urban areas have more advantages over those in rural areas of the high perishability of the produce and the lower cost of marketing. On one hand the time lapse between harvesting and marketing is very short, implying low level of deterioration/ perishability of the produce. On the other hand urban farmers do not have to incur transportation costs, which is for them a saving. Leafy vegetables are the main urban horticultural produce grown for the market. Traders, mainly retailers often purchase them at the producer's plots.
- The urban horticultural producers, mainly vegetables' producers, sell the products directly to retailers and sometime to wholesalers. The rural horticultural producers depend heavily on wholesalers who have to transport the products to urban markets.

- In dry seasons, Many neighbouring regions produce the same produce, i.e. Tanga, Iringa, Mbeya and coast regions. The competition becomes very strong in terms of quality and quantity.
- The major markets – Dar es Salaam city and Morogoro municipality do not only depend supplies from Morogoro rather from the above mentioned regions. Thus the supply exceeds the demand, leading to throw away prices based on something is better than nothing.
- The wholesalers based in Morogoro, who normally purchase these produce from Morogoro farmers in rural area reduce the amount of their purchases because of the excessive supply of the produce mainly from Mbeya and Iringa. They only purchase a certain small amount which they think could be sold at once.
- The absence of the central technical storage facilities at the markets encouraged them more to purchase a small amount of the produce from the farmers in Morogoro rural district.
- Majority of the retailers face losses mainly because of fast deterioration of quality and quantity of the produce which compels them to opt for throw away prices. This stems from:
 - Some of the retailers put their produce for sale either on wooden market stalls which are constructed with a roof shelter against sun and rain or on the ground.
 - Some have self founded informal markets, mostly along the road side. The fruits and vegetables are put on ground, unsheltered, leading to fast drying and deterioration.
 - Majority of them have no specific units for selling these produce.
 - Head transport system is commonly used by some retailers. Their produce are in uncovered traditional baskets known as “Tengas”.

3.5 Quantitative (physical) losses

The quantitative losses are realised by the reduction in number or amount of fruits and vegetables which were not marketed because of various damages. These losses affect market pricing and consumption patterns, e.g. drying up of

the produce, injury, especially to fruits and vegetables, microbial spoilage (decay), insect spoilage etc.

Our discussions, the most affected producers and dealers of fruits and vegetables as far as quantitative losses are concerned are the small-scale farmers and retailers. These quantitative losses are outstanding right from the farm to the market levels. Primarily they start when fruits and vegetables are released from the farm and keep increasing during the packing, transportation and marketing. This is the result of poor packing, transportation abusive handling, and absence of technical storage facilities in production areas and at the markets and limited traditional methods of preserving the vegetables e.g. sundrying.

3.6 Qualitative losses

The main qualitative losses observed include sensory attributes i.e. colour, over ripening, gloss, size and shape defects, texture flavour or taste and hidden attributes i.e. nutritive value. These losses obviously affect market pricing and consumption patterns.

4. RECOMMENDATIONS

4.1 Long term intervention strategies

- In order to support these horticultural farmers, it is recommended to have common technical storage facilities within the production areas.
- To design good packing facilities for fruits and vegetables instead of “Tengas”.
- To have transport facilities designed for transporting these horticultural produce.
- Explore the possibilities of liberalising markets of horticultural products.
- For wholesalers and retailers at the market, it is also recommended to have a central technical storage facility at the market.

4.2 Short term intervention strategies

- To build a market designed for marketing fruits and vegetables.

- Improved traditional processing methods e.g. sun drying should be encouraged.
- Encouragement of household fruits and vegetables canning, especially during high season.

5. CONCLUSIONS

Poverty is one of the serious problems in Tanzania. It has been noted that high losses of horticultural produce are experienced by farmers, wholesalers and retailers in our study areas. We have also identified the major causes of these losses, namely absence technical storage, transport and packaging facilities and unavailability of appropriate markets designed for fruits and vegetables. Improvement of the economic conditions of the horticultural farmers, wholesalers and retailers can be achieved by providing the above mentioned facilities.

Equally important, poor healthy condition of majority of the Tanzanians is another serious problem. The composition of fruits and vegetables, which is made of minerals, proteins, vitamins and fibres, are very essential elements in maintaining and in improving healthy conditions of the Tanzanians. It is frustrating to note the high losses of fruits and vegetables when the majority of the population is undernourished.

REFERENCES

DAVIS, H., 1979. *Processing equipment for agricultural products*. 2nd Ed. Westport Conn. AVI Publishing Co.

EL-KAMMASH, M.M., 1969. *Economic development and planning in Egypt*. Praeger: Special Studies in International Economics and Development.

FAO 1975. *The state of food and agriculture*. Food and Agriculture Organisation of the United Nations (Rome).

FAO. 1988. *The World Market for Tropical Horticultural Products*. FAO Economic and Social Development Paper.

JANIC, J., 1979. *Horticultural Sciences*. 3rd ed. San Francisco, W.H. Freeman.

LORENZ, O.A. & MAYNARD, 1980. *Knott's handbook for vegetables growers*. 2nd ed. New York, John Wiley & sons. Inc.

MLAMBITI, M.E., 1975. *Structural patterns in the marketing system of selected fruits and vegetables in Morogoro district*. The Place of Co-operative Marketing; Part I & II Dept. of Rural Economy & Extension, Faculty of Agric., University of Dar es Salaam.

RYALL, A.L., 1978. *Handling, transportation and storage of fruits and vegetables* Vol. 2, 2nd ed. Westport, connecticut, AVI Publicating Co.

THOMSON, A., 1993. *Promoting sector investment in agricultural marketing in Africa*. C.T.A. Technical Centre for Agricultural and Rural Cooperation. London Westview Press.